FGV IIU Flash Notes

Monitoring the Return to Normality in Six European Countries I: A Standstill with Positive Signs

(week ending on May 17, 2020)

FGV IIU International Intelligence Unit

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1. Introduction: slow progress but falling deaths.

The beginning of a normal life, duly anchored by cautionary measures regarding displacements and social behaviour in public places, in most of the six European countries at stake -Belgium, France, Germany, Italy, Portugal and Spain- has presented no negative outcomes up to the last week considered in this Note. However, none or rather very slow progress has been seen as regards the decline of the structural dynamics of the epidemic, signalling that it will linger on for quite a few months, and vigilance must be on.

As availability of hospital care -notably beds in intensive care units- has been perhaps the major reason for the lockdown, one could say that a positive phase seems to have started: in all six countries deaths continue to fall.

We prefer to characterise this moment as a kind of standstill; very likely, normal life will continue to translate into some people getting infected and a few, unfortunately, dying. The path to herd immunity seems long and winding[1], and though the overall conclusions of this Note are encouraging, care must not be relaxed, and the aggressive testing policy (well) conducted by most of the countries must proceed, to give fuller assurances on normality.

We examine the situation in the six EU members under study, by means of two proposals put forward in Flôres (2020)[2] and already exploited in FGV IIU (2020)[3]; a document to which this Note must be considered a sequel.

The proposals refer to the ratios of new daily cases, discussed in section 2, and to simple regressions using recent data on daily deaths, discussed in section 3. All data come from the *worldometers.info* public site. Section 4 concludes, with an overall positive outlook of the return to normality, up to May 17, though a proviso on data quality is made.

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[1] It must be pointed out that, for the Covid-19 pandemic, some epidemiology and medical experts are starting to question whether and how the herd immunity concept applies.

[2] *Corona Data Analyses: Looking for Signs of Recovery in Italy and Spain*, FGV IIU Discussion Papers DP 02/20, R. G. Flôres Jr., with the assistance of L. Garnitskiy, 2020; Rio de Janeiro: FGV International Intelligence Unit. Two statistical procedures to be used in the monitoring of the decline side of the contagion curve are described.

[3] *The 19th Week Effect: Prospects for Flexibilization in Six European Countries.* FGV IIU Flash Notes; May 7, 2020. Rio de Janeiro: FGV International Intelligence Unit.

2. Evidences from ratios of new daily cases.

As mentioned and explained in previous Notes[4], the ratio of new daily cases, at a *basic evolution period of the epidemic*, may be assumed to be a function of two parameters deeply related to the dynamics of the epidemic process within a given community: the average number of people infected by a person with the virus at the start of the period, and a synthetic measure of the proportion of infected people who, for a variety of reasons, may be considered outside the contagion group, at the end of the period.

The "basic evolution period of the epidemic" has been chosen as 14 days, a period during which, *broadly*, infected people at the beginning can either be cured, or hospitalised, or die, new contagions reveal themselves, and precautionary measures have a minimum time for becoming effective. In the context of return to normality, the latter refer to the new social dynamics where, for sure, a set of precautionary measures are still on, though slowly being relaxed.

The ratios should (and must) change along the evolution of the epidemic, notably its decline, hopefully decreasing too; signalling how positive, or not, is being the policy package that has been implemented. They must reach values below 1 and then continue to (ideally, steadily) fall.

They are unfortunately affected by noise from various sources[5] and, during the more recent weeks of the period under analysis, by the more aggressive and encompassing testing policy that has then been (correctly) applied, in order to better check the feasibility of the return policies and prevent surprises. This reduces underreporting on contagion -a positive outcome- but, ironically, by inserting the 'newcomers' uncovered by the new dynamics, different from the one prevailing beforehand, it pushes up the daily new cases data and may produce peaks in our ratios -*solely due to this improved measurement of contagion, and not to a surge in the epidemic*.

But other issues affecting data reliability and quality also took place.

[4] See footnote 2; the analyses to follow are a sequel to those discussed in the Flash Note mentioned in footnote 3.
[5] It is neither the case nor the object of this Note to dwell on these sources here; some has been said on them in the works previously cited.

By the second half of May, the French government made a revision of Covid-19 statistics, particularly contagion data, and our public data source, the *worldometers.info* site, was forced to display a negative value (-141) for new daily cases in France, on May 16, in order to adjust to these corrections. On May 13, it had already displayed zero new cases in France.

With better statistics, more testing and knowledge on the processes, data discrepancies among public, open sites are increasing; something due to get worse in the short run. We however continue to stick to our original source.

Exhibit 1 shows the ratios for the six countries -Belgium, France, Germany, Italy, Portugal and Spain- for the period from March 22 to May 3. The *series of daily (two-weeks) ratios*, with a last observation on May 3 (two weeks more, one arrives at May 17, the last observation), is shown in each graph, together with that of a five-days moving median, a convenient way to filter the noise in the original series.

The six graphs, in our previous analysis, had been divided into three groups; we shall keep them in this updating[6].

The first one, made of France and Germany (Exhibits 1.a) and 1.b)), showed no improvement. Quite on the contrary, Germany moved to a somewhat higher level, showing a slightly increasing trend, towards 0.60 at the end. Nothing to be worried about, though the status quo of the contagion process -even considering that the last higher values may be due to the continued aggressive testing policy implemented- likely remained the same. France maintained its better performance, keeping its fairly stable platform around 0.39 or less. The moment when the official data revision introduced clear outliers, reaching a ratio of 3.79 on May 1 - after a ratio of zero, on April 29, due to the May 13 zero (see above)-, followed by the negative value the next day, seems to have been successfully filtered by the moving-medians. In principle, things will come back to the previous levels or even lower.

The evolution of contagion thus seems to follow its own epidemiological speed. Given this sort of standstill, we prefer not to re-estimate the time length till things may approach normality, keeping the end of May as an optimistic date now.

[6] See footnotes 3 and 4. Analyses usually refer to the smoothed, moving medians series; when a needed reference to the original ratios may cause confusion, the qualification ‘crude ratios’ is used.

The second group (1.c) and 1.d)), Belgium and Italy, had been considered a transition group, but this time displayed the most consistent and positive behaviour. Both moved to lower level platforms, with Belgium around 0.53 (with an increasing trend in the last median, to be checked next week) and Italy positioning itself rather steadily in the 0.43 – 0.46 interval. The few peaks in the crude data, notably in Belgium as in the last analysis, are probably due to testing.

The lower ratios -before we worked with 0.76- allow one to keep the second half of August as the moment when "normality may be assumed".

The third and final group (1.e) and 1.f)), which in the previous analysis revealed to be more problematic, comprised the Iberian Peninsula.

Portugal, after having followed an encouraging, decreasing trend, presented a highly volatile behaviour in the crude ratios, starting around April 14, reaching extreme high peaks -higher than 1- on the 17th, 23rd and 29th of the same month, and on May 3, when a ratio of 2.46 was computed. This effect and trend -undoubtedly disturbing- can in principle be attributed to the generalised testing policy the country has been pursuing, including universal testing of those in pensions and houses for retired or old age people. If this is really the case, next week data will show an improvement.

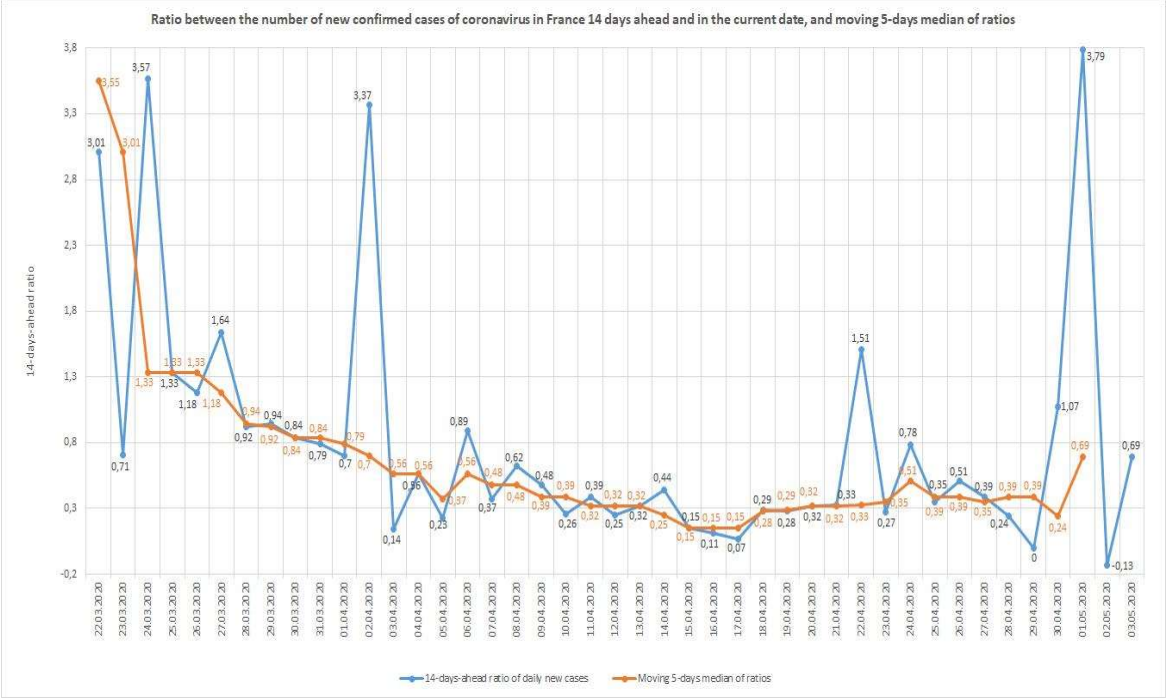
On the other hand, Spain, which together with Italy has been severely hit by the virus, showed improvements: a steady if slow decline, with values still a bit high, now between 0.51 and 0.67, but the epidemic does seem to be in decrease. The period of normality is still expected for after summer.

3. Data on daily deaths.

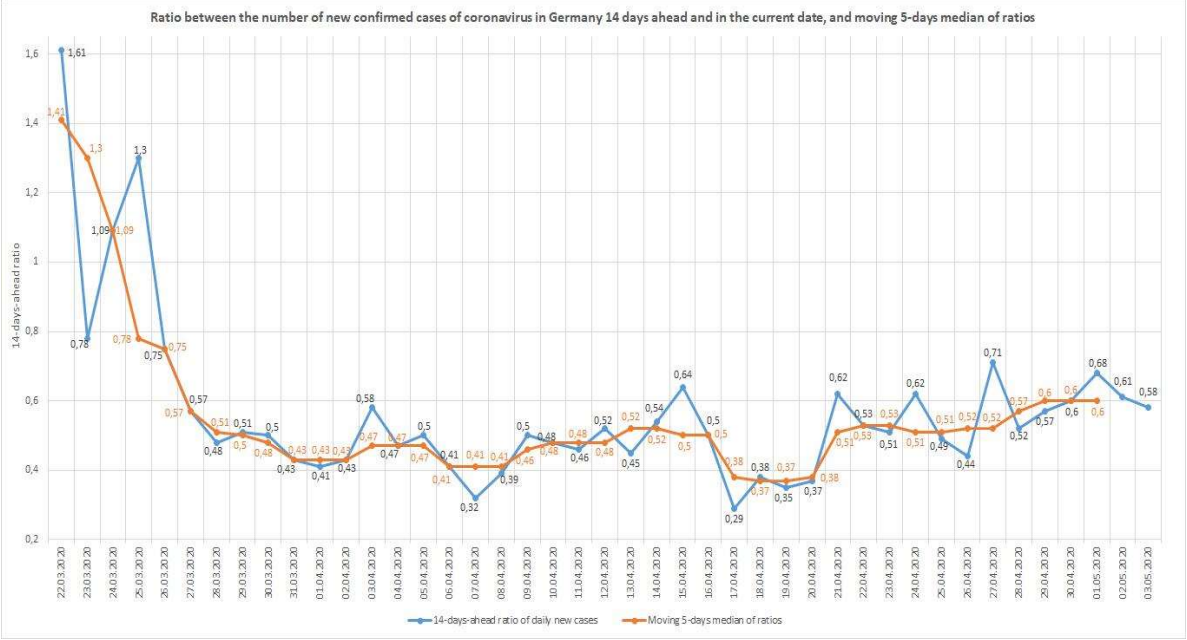
The second approximate tool tries to perceive a trend in the decrease of daily deaths -also and inevitably full of noise. The 21 more recent observations are used and a straight line is fitted to these data. The regressions must fulfil minimal goodness-of-fit criteria: a R^2 of at least 0.45, and coefficients significant at least at 5 per cent.

Exhibit 1: Ratio between the number of new confirmed cases of coronavirus 14 days ahead and in the shown date, starting on March 22, 2020 (actual values and five-days moving medians).

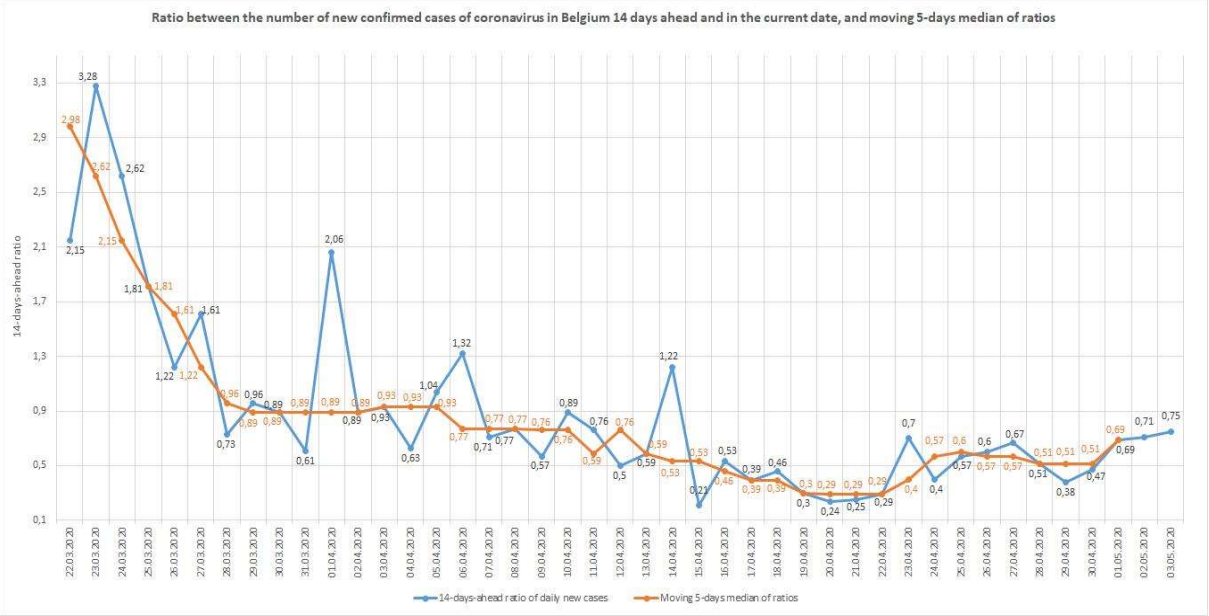
1.a) France



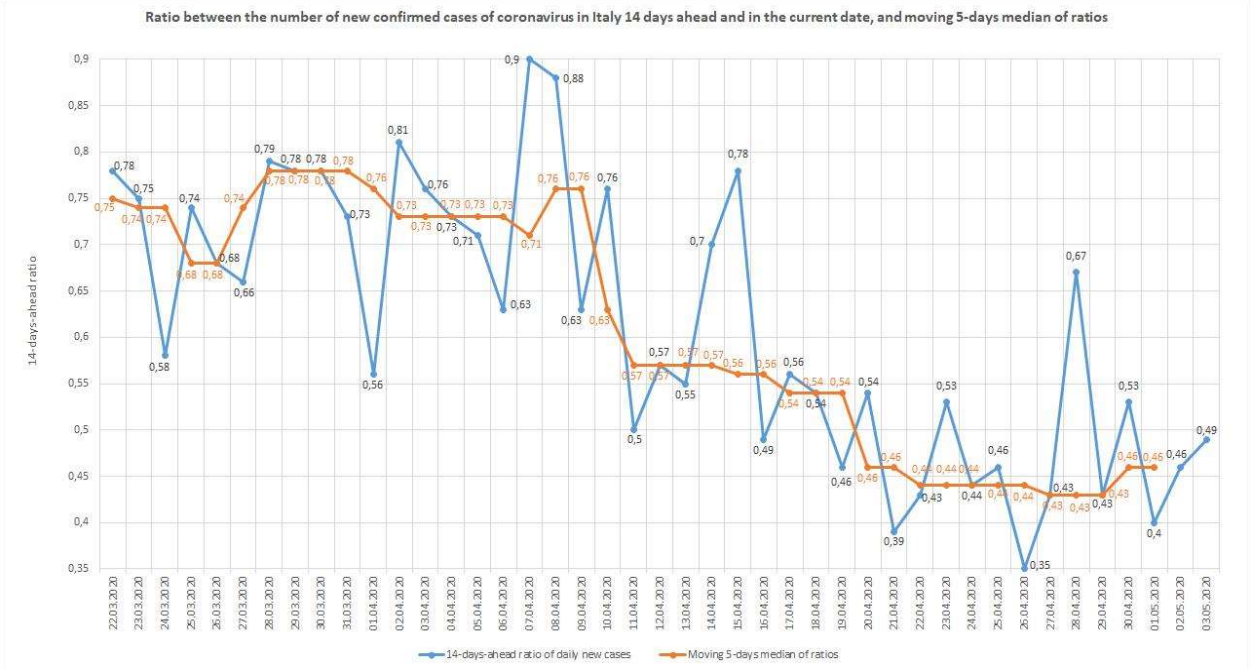
1.b) Germany



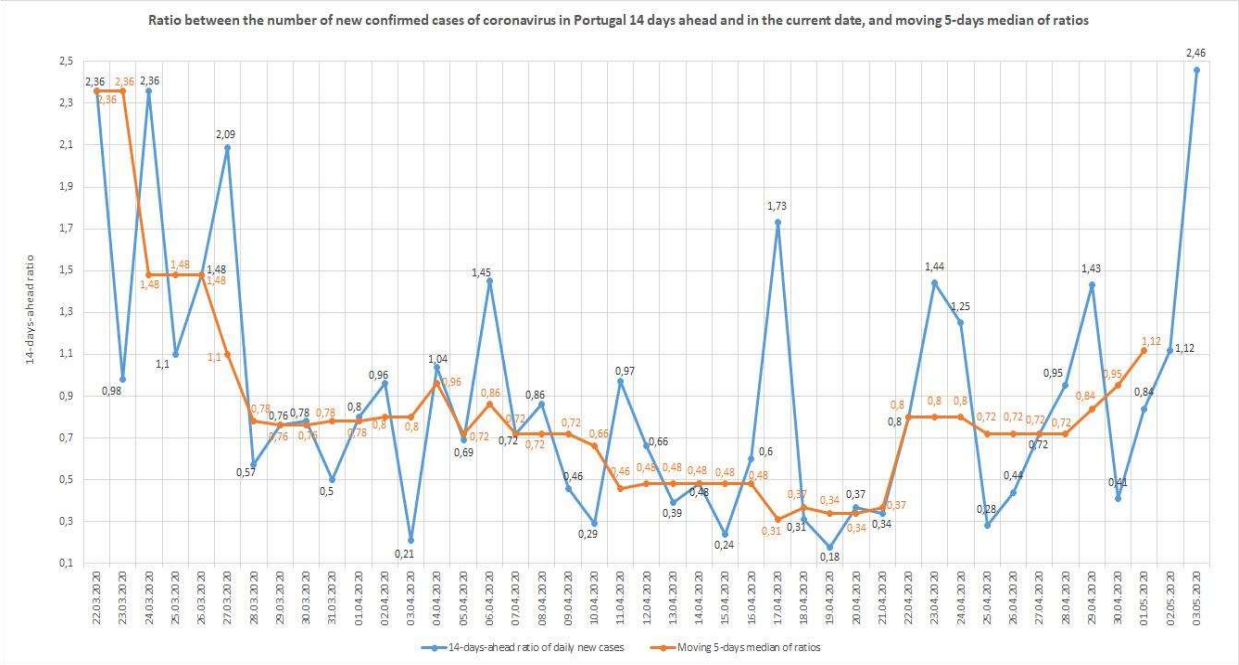
1.c) Belgium



1.d) Italy



1.e) Portugal



1.f) Spain

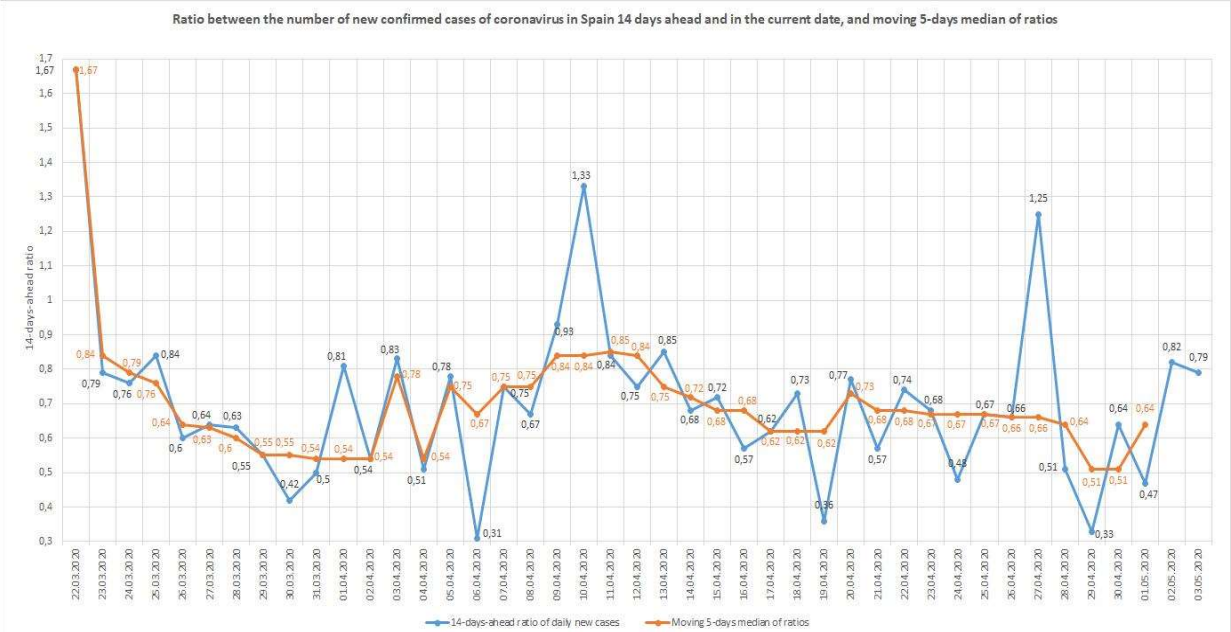


Exhibit 2 shows the straight-line results for all the six countries[7], in the same order of the previous Exhibit. In overall terms, improvement took place as -whatever parameter(s)[8] one chooses- the daily number of deaths has unequivocally fallen everywhere. Average daily deaths in the three weeks ending on May 17, were 250 in France and 93 in Belgium, for instance, reaching 15 in Portugal.

This is an indirect evidence of progress as, despite the confusing recent behaviour of ratios in France and Portugal -assumed, as explained before, to be mostly due to data revisions and a continued testing policy in both countries- they are lower than 1, meaning that even with slow or no progress in the basic rates, the epidemic is losing speed[9], and less deaths must occur.

The country data usually presented great variability, actually very strong in France and Belgium (2.a) and 2.c)), making the corresponding regressions senseless; in the former, the data roughly oscillated wildly around its mean. Looking at the graphs, it is also clear that in each of them there is a blatant outlier – 483 on May 17 for France, and 323 on May 6, for Belgium- further disrupting the regression results.

Germany (2.b)) presented a somewhat better result, with 26 per cent of explained variance and a significant angular coefficient signalling a daily decrease of 5.4 deaths. However, it also presented data difficulties, with a zero deaths value on May 5, followed by a peak of 282 deaths the next day (May 6, the same day of the Belgian outlier) –a strong suggestion that reporting problems may have taken place. Of course, this odd oscillation contributed to the poorer regression result.

Consistent and more clearly positive behaviour is shown by Italy and Spain (2.d) and 2.f)), with significant coefficients signalling daily decreases in deaths of 9 and 11, respectively. Portugal (2.e)) also displayed a good result with an estimated daily decrease in deaths of 1 (these data for the country are already at low levels).

For each country, the so-called pessimistic line is also shown; obtained by subtracting two standard-errors to the intercept and adding two to the angular coefficient. The point this line cuts the horizontal axis gives an idea of a notional day when zero

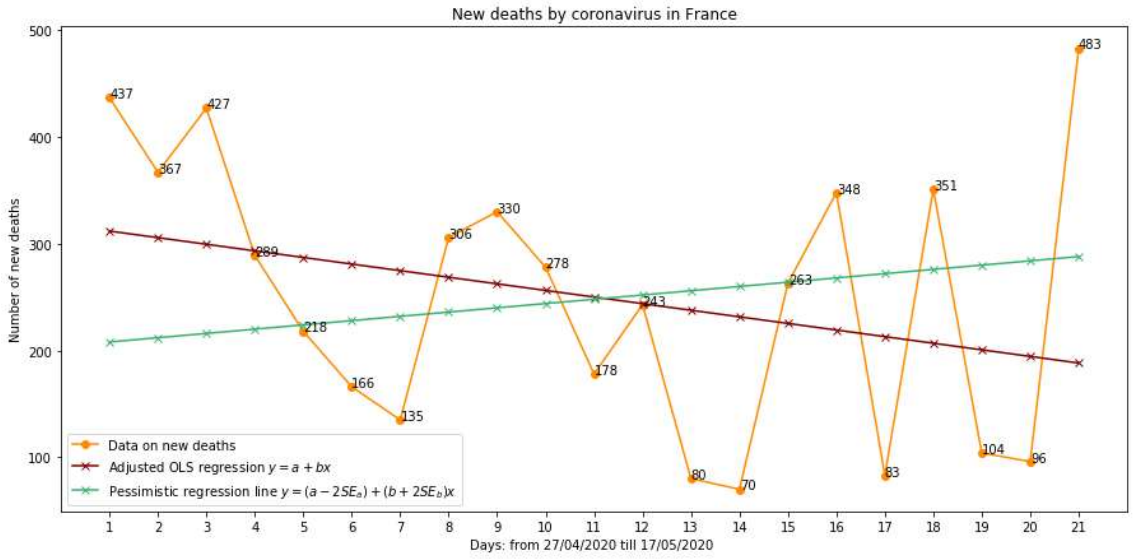
[7] Basic statistics on the regression results may be demanded at npii@fgv.br .
[8] Be it a mean, media, min and max values, whatever.
[9] Because the ratios are lower than 1; see the text at the beginning of the section and also, for a fuller explanation, the one in footnote 2.

deaths will be observed[10]. For the last three countries, this notional "zero deaths date" makes sense, and it roughly confirms that by June Italy and Spain may be clear of corona deaths[11], the same applying for Portugal (by June 11/12).

In order to highlight how data reliability is crucial, the regressions for France and Belgium can be re-estimated without the respective outliers. Exhibit 3 shows the graph and results for Belgium, where a better behaviour is obtained. The notional zero-deaths day is now June 11-12, not too far from the May 22-23 previously calculated.

Exhibit 2: The regression lines for the six countries, using daily deaths data from April 27 to May 17. The pessimistic line is also shown in each graph

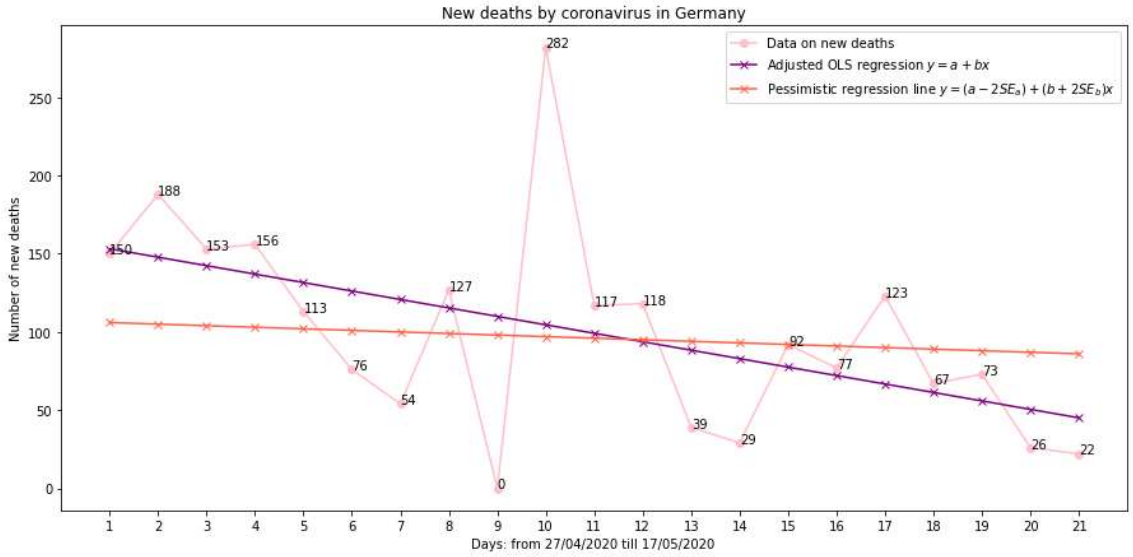
2.a) France – the two lines are shown only for illustration purposes; notice the odd value for May 17 (483 deaths).



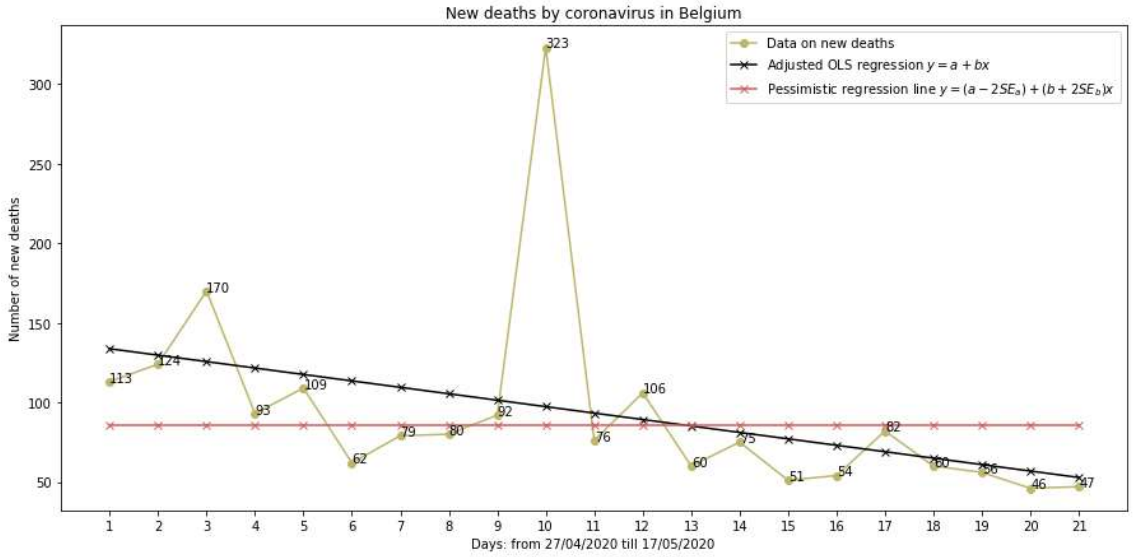
[10] For more on this idea see the reference in footnote 2. The adjective 'notional' is very important, because this is a mere extrapolation from the curve, a "zero-deaths day" seeming not feasible yet. Nevertheless, as "the period till normality" in section 2, it provides an idea of a date when things will be better.

[11] Comparing to the previous results (see footnote 3), there is a reversion, with Spain (5/6, previously 13/14) now before Italy (22/23, previously 3/4), but, as known, this is a broad forecast and both displacements may be considered consistent with the accuracy level of this measure.

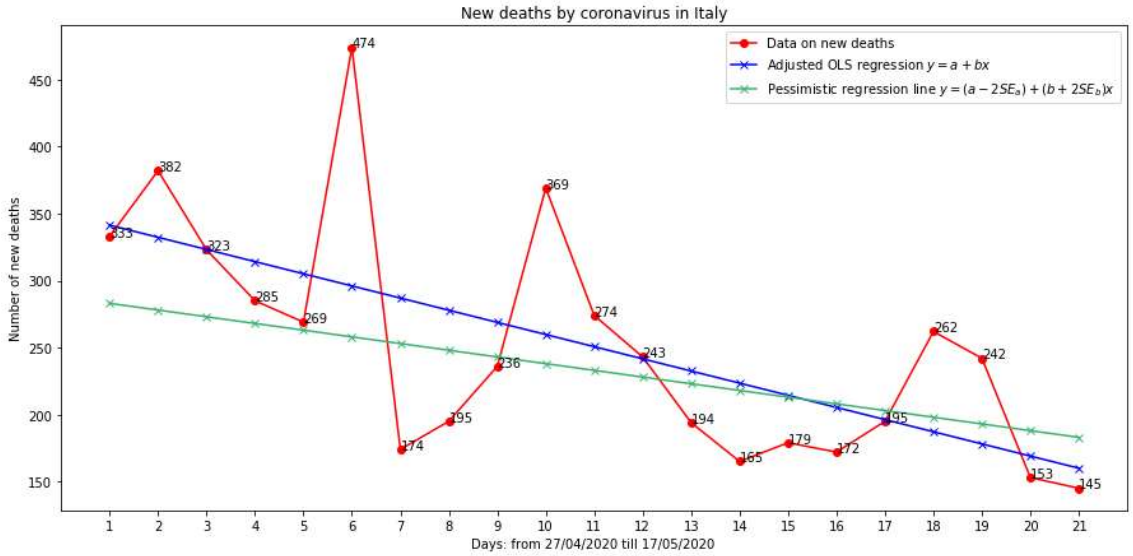
2.b) Germany – the “pessimistic line” is nearly horizontal; notice the odd variation from 0 to 282 (points 9 and 10), which certainly demands explanation [see also the text].



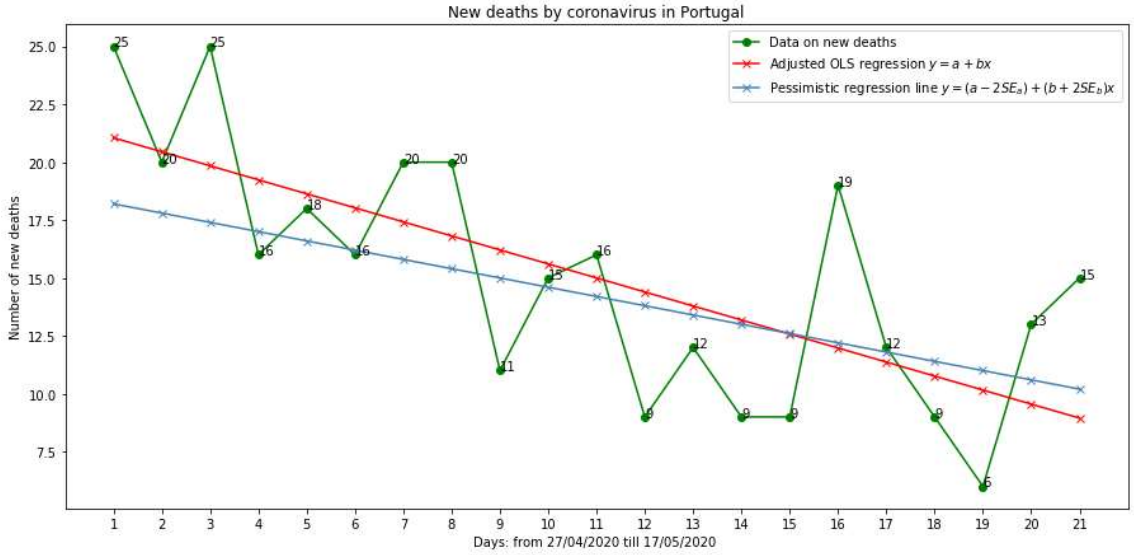
2.c) Belgium – notice the striking 323 value at day 10 (May 6).



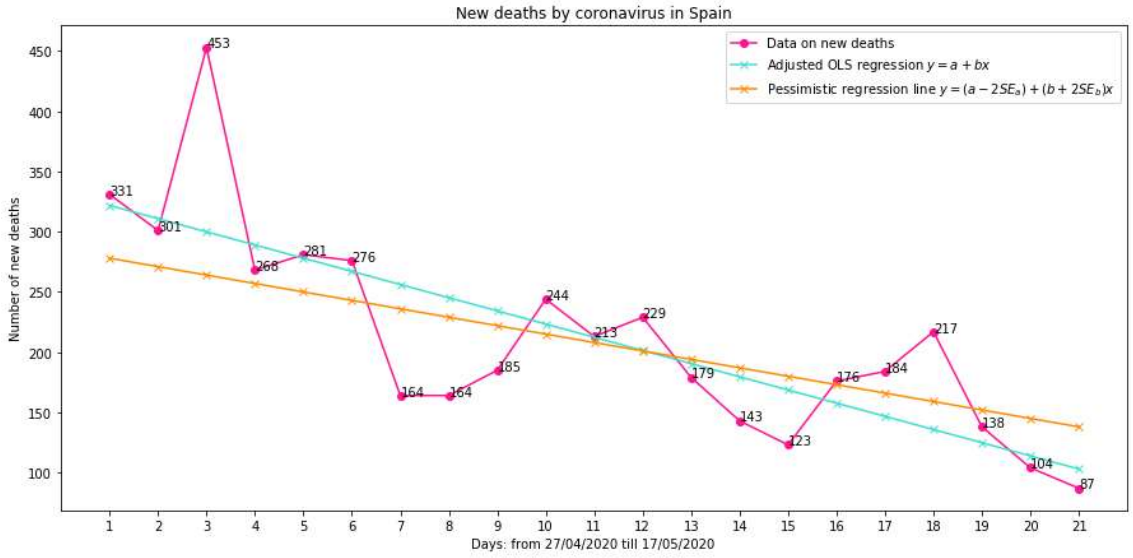
2.d) Italy.



2.e) Portugal – daily deaths are already low, in relative terms.



2.f) Spain



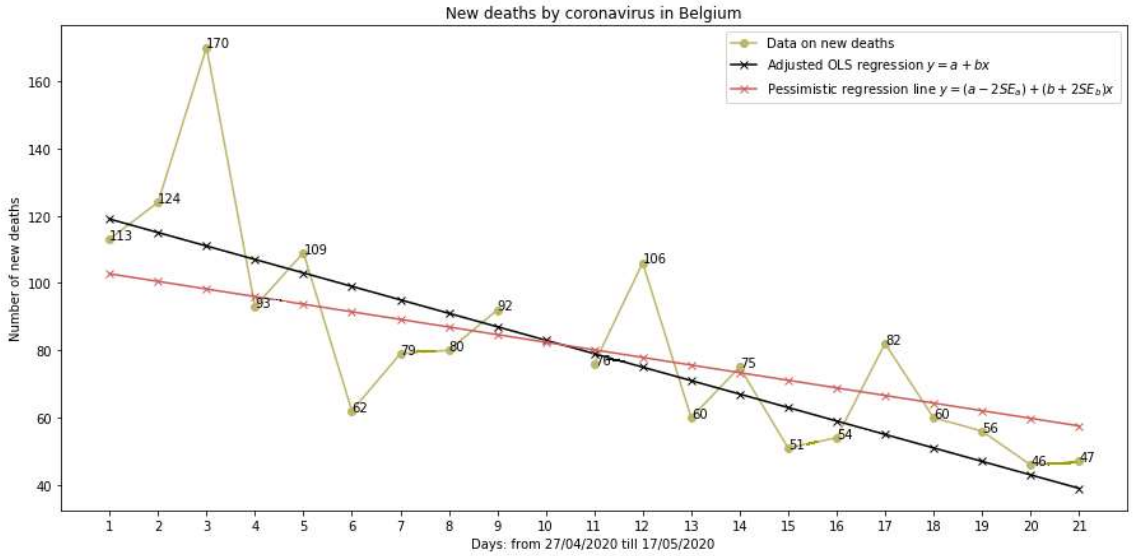
The above approach could be pursued for France, and even Germany, given the problems already mentioned with their data. However, good applied statistics practice tells that outliers should also be defined with care, and, ideally, a full explanation for their odd behaviour must be provided. As testing and data revisions -hopefully thanks to improvements in the data collection and classification procedures- seems to be the main cause for them, we prefer to wait for one more week to see how things evolve.

4. Summing up.

The performance of the two ancillary indicators has not given reason to worries about how the return to normality has been evolving in the six countries, up to May 17. Data problems have plagued the ratios analyses, especially in France and Portugal, but also, though perhaps less, in Germany and Belgium -in these two, also as regards the daily deaths statistic. Somewhat ironically, the countries that suffered most in the epidemic -Italy and Spain- now showed the steadier move to normality.

Notwithstanding, there is reasonable support to say that the new cases ratios in all countries must be around 0.50, a value that already ensures that contagion per unit of time will continue to decrease, and consequently deaths -as evidenced in all the six cases. No reversal has been identified but, once more, progress moves slowly.

Exhibit 3: Belgium – fitting a straight line to 20 observations related to daily number of deaths, after the May 6 outlier has been removed (compare with Exhibit 2.c)).



OLS Regression Results

Dep. Variable:	newdeaths_Belgium	R-squared:	0.584
Model:	OLS	Adj. R-squared:	0.561
Method:	Least Squares	F-statistic:	25.23
Date:	Thu, 21 May 2020	Prob (F-statistic):	8.83e-05
Time:	16:15:14	Log-Likelihood:	-87.862
No. Observations:	20	AIC:	179.7
Df Residuals:	18	BIC:	181.7
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
date	-3.7372	0.744	-5.023	0.000	-5.300	-2.174
const	123.0465	9.427	13.052	0.000	103.240	142.852

Omnibus:	9.267	Durbin-Watson:	2.118
Prob(Omnibus):	0.010	Jarque-Bera (JB):	6.992
Skew:	1.021	Prob(JB):	0.0303
Kurtosis:	5.054	Cond. No.	26.0

The situation must still improve, but it is hoped that next-week analyses will show that advances are actually taking place. Nevertheless, attention, by all means, must be on.

A final point on data reliability must come round.

The galaxy of Covid-19 statistics is plagued with noise and errors, and needs amelioration. The number of public data sources has been increasing -what is positive- but the disparities among them highlight the confusion that still reigns.

Without continuing efforts, by all offices, authorities and institutions involved, towards better quality and accuracy of available data -as well as finer disaggregation, according to spatial, demographic and social categories- analyses remain seriously constrained.

This Note has been a telling example of how data unreliability may impair even simple analyses; a situation even more serious if one considers the modelling and simulation endeavours published up to now. They risk to stand as speculations of limited value, if real progress on the published data -and discerning use of them- does not take place.